

IN THE CLAIMS:

Please amend the claims as indicated below.

1. (Original) A method for compensating for polarization mode dispersion in an optical fiber communication system, comprising the steps of:  
reducing said polarization mode dispersion using a cascade of all-pass filters; and  
adjusting coefficients of said all-pass filters using a least mean square algorithm.
- 2 (Original) The method of claim 1, wherein said cascade of all-pass filters comprises a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers.
3. (Original) The method of claim 1, wherein said coefficient values are adjusted to minimize a cost function.
4. (Original) The method of claim 1, further comprising the step of measuring said polarization mode dispersion in a received optical signal.
5. (Original) The method of claim 4, wherein said measuring step employs a tunable narrowband optical filter to render information from energy detector measurements.
6. (Previously Presented) The method of claim 1, wherein said cascade of all-pass filters comprises a first all-pass filter A having a vector a comprised of P coefficients and a second all-pass filter B having a vector b comprised of Q coefficients and wherein said least mean square algorithm adjusts said coefficients as follows:

$$w(n+1) = w(n) - \mu \nabla(J),$$

where  $n$  indicates the current iteration number and  $w$  is a composite coefficient vector defined as:

$$w = \begin{bmatrix} a \\ b \end{bmatrix}, \nabla(J) \equiv \begin{bmatrix} \frac{\partial J}{\partial a^T} & \frac{\partial J}{\partial b^T} \end{bmatrix}^T$$

is the  $(P+Q) \times 1$  complex gradient of  $J$  with respect to  $w$  and  $T$  indicates a transpose operation, and

$$\frac{\partial J}{\partial a^T} \equiv \begin{bmatrix} \frac{\partial J}{\partial a_1} & \frac{\partial J}{\partial a_2} & \dots & \frac{\partial J}{\partial a_P} \end{bmatrix}, \text{ and}$$

$$\frac{\partial J}{\partial b^T} \equiv \begin{bmatrix} \frac{\partial J}{\partial b_1} & \frac{\partial J}{\partial b_2} & \dots & \frac{\partial J}{\partial b_Q} \end{bmatrix}.$$

7 (Original) A method for compensating for polarization mode dispersion in an optical fiber communication system, comprising the steps of:

reducing said polarization mode dispersion using a cascade of all-pass filters; and

adjusting coefficients of said all-pass filters using a Newton algorithm

8 (Original) The method of claim 7, wherein said cascade of all-pass filters comprises a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers.

9 (Original) The method of claim 7, wherein said coefficient values are adjusted to minimize a cost function.

10 (Original) The method of claim 7, further comprising the step of measuring said polarization mode dispersion in a received optical signal.

11 (Original) The method of claim 10, wherein said measuring step employs a tunable narrowband optical filter to render information from energy detector measurements.

12 (Previously Presented) The method of claim 7, wherein said cascade of all-pass filters comprises a first all-pass filter A having a vector a comprised of P coefficients and a second all-pass filter B having a vector b comprised of Q coefficients and wherein said Newton algorithm adjusts said coefficients as follows:

$$w(n+1) = w(n) - \mu H^{-1} \nabla(J)$$

where n indicates the current iteration number and w is a composite coefficient vector defined as:

$$w = \begin{bmatrix} a \\ b \end{bmatrix}, \nabla(J) \equiv \begin{bmatrix} \frac{\partial J}{\partial a^T} & \frac{\partial J}{\partial b^T} \end{bmatrix}^T$$

$\frac{\partial J}{\partial a^T} \equiv \begin{bmatrix} \frac{\partial J}{\partial a_1} & \frac{\partial J}{\partial a_2} & \dots & \frac{\partial J}{\partial a_P} \end{bmatrix}$ , is the  $(P+Q) \times 1$  complex gradient of J with respect to w,

T indicates a transpose operation and, a Hessian matrix, H, is defined as follows:

$$H = \frac{\partial^2 J}{\partial w \partial w^T} = \begin{bmatrix} \frac{\partial^2 J}{\partial a \partial a^T} & \frac{\partial^2 J}{\partial a \partial b^T} \\ \frac{\partial^2 J}{\partial b \partial a^T} & \frac{\partial^2 J}{\partial b \partial b^T} \end{bmatrix} \text{ and}$$

$$\frac{\partial J}{\partial b^T} \equiv \begin{bmatrix} \frac{\partial J}{\partial b_1} & \frac{\partial J}{\partial b_2} & \dots & \frac{\partial J}{\partial b_Q} \end{bmatrix}.$$

13. (Original) A polarization mode dispersion compensator in an optical fiber communication system, comprising:

a cascade of all-pass filters having coefficients that are adjusted using a least mean square algorithm.

14. (Original) The polarization mode dispersion compensator of claim 13, wherein said cascade of all-pass filters comprises a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers.

15. (Original) The polarization mode dispersion compensator of claim 13, wherein said coefficient values are adjusted to minimize a cost function.

16. (Currently Amended) The polarization mode dispersion compensator of claim 13, further comprising ~~the step of~~ a polarization mode dispersion measuring device for measuring said polarization mode dispersion in a received optical signal.

17 (Currently Amended) The polarization mode dispersion compensator of claim 16, wherein said ~~measuring step~~ polarization mode dispersion measuring device employs a tunable narrowband optical filter to render information from energy detector measurements

18. (Original) A polarization mode dispersion compensator in an optical fiber communication system, comprising:

a cascade of all-pass filters having coefficients that are adjusted using a Newton algorithm.

19. (Original) The polarization mode dispersion compensator of claim 18, wherein said cascade of all-pass filters comprises a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers.

20. (Original) The polarization mode dispersion compensator of claim 18, wherein said coefficient values are adjusted to minimize a cost function.

21. (Currently Amended) The polarization mode dispersion compensator of claim 18, further comprising ~~the step of~~ a polarization mode dispersion measuring device for measuring said polarization mode dispersion in a received optical signal.

22. (Currently Amended) The polarization mode dispersion compensator of claim 21, wherein said ~~measuring step~~ polarization mode dispersion measuring device employs a tunable narrowband optical filter to render information from energy detector measurements.